

In the Claims:

Please amend the claims as follows:

1. (currently amended) A method of tuning an arc welding system comprising an electric circuit including a power source, and a control system including a computer and a memory, the method comprising:

providing a simulation model of the arc welding system, the simulation model comprising system input parameters that are characteristic for the arc welding system;

calibrating the simulation model to represent an actual welding situation by measuring values of the system input parameters on the arc welding system and feeding the values of the system input parameters to the simulation model;

~~determining values of system input parameters of the electric circuit and feeding the system input parameters to a simulation model of the arc welding system;~~

calculating tuning parameter values based on the system input parameters by using the simulation model of the arc welding system; and

tuning the arc welding system by implementing the tuning parameter values into the control system;

~~wherein the simulation model is calibrated to represent the actual welding situation by measurement of the model parameter values on a welding station on site.~~

2. (currently amended) A method according to claim 1, wherein ~~the calibration~~ calculating tuning parameter values comprises a first calibration mode comprising:

short-circuiting the electric circuit over ~~the~~ an arc;
sending a controllable current and voltage through the system; and
measuring ~~the~~ resistances and ~~the~~ inductances of the electric circuit.

3. (currently amended) A method according to claim 1, wherein ~~the calibration~~
calculating tuning parameter values comprises a second calibration mode comprising:
empowering ~~the~~ a welding station with full power to produce an arc;
measuring values of ~~the~~ current and ~~the~~ voltage of the electric circuit; and
adjusting the model so that predicted values match the measured values of the current and
the voltage.

4. (currently amended) A method according to claim 1, wherein ~~the calibration~~
calculating tuning parameter values comprises a third calibration mode comprising:
empowering ~~the~~ a welding station with full power to produce an arc;
performing a plurality of process modes ~~by the~~ with a control unit; and
extracting ~~the~~ a characteristic fingerprint pattern of the power source from measurement
of current and voltage under each of the performed process modes.

5. (currently amended) A method according to claim 1, wherein the simulation model is
brought to comprise a model component of ~~the~~ a metal transport between ~~the~~ an electrode and
~~the~~ a workpiece, the metal transport model is brought to comprise a first model part of a region
close to ~~the~~ a wire, a second model part of ~~the~~ an arc column, and a third model part of ~~the~~ metal
condensing in ~~the~~ a region close to the workpiece, the simulation model further comprising a

model part of the power source used to generate the metal transport, and a model part of ~~the~~ an electrical circuit connecting the wire, the arc column, and the workpiece and the power source together.

6-9 (cancelled)

10. (withdrawn) A computer program product comprising
a computer readable medium; and
computer program instructions recorded on the computer readable medium and
executable by a processor to perform a method of tuning an arc welding system comprising an
electric circuit including a power source, and a control system including computer means and
memory means, the method comprising determining values of system input parameters of the
electric circuit, calculating tuning parameter values from these system input parameters by using
a simulation model of the arc welding system, and tuning the arc welding system by
implementing the tuning parameter values into the control system, wherein the simulation model
is calibrated to represent the actual welding situation by measurement of model parameter values
on the welding station on site .

11. (withdrawn) The computer program product according to claim 10 provided at least
in part over a network.

12. (withdrawn) The computer program product according to claim 11, wherein the
network comprises the internet.

13. (previously amended) The method according to claim 1, wherein the simulation model comprises a calibration unit configured to calibrate the simulation model, an input unit configured to receive measured model parameter values, a calculation unit configured to calculate tuning parameter values, and an implementing unit configured to implement the parameter values into a control system of a robotic arc-welding station representative of the simulation model.

14. (previously presented) The method according to claim 5, wherein the model parameters of the electric circuit comprise inductance and resistance of a first electric path, inductance and resistance of a second electric path, current and voltage of a process mode, and a correspondent behavior of the power source.

15. (previously presented) The method according to claim 1, wherein the simulation model comprises parameter values for properties related to the power source, a wire, a workpiece, a weld profile and metal transfer between the wire and the workpiece.